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CERTAIN SHELL HEAPS OF THE ST. JOHN'S RIVER,
FLORIDA, HITHERTO UNEXPLORED.

BY CLARENCE BLOOMFIELD MOORE.

(First Paper.)

While the shell heaps of the east coast and of the west coast of Florida have received careful attention, the fresh-water shell deposits of the St. John's River for nearly a score of years have been entirely neglected. In 1875 appeared Prof. Jeffries Wyman's memoir "Fresh-water Shell Mounds of the St. John's River, Florida," embodying in an exhaustive way the researches of the learned author, conducted in person—researches for which his position as curator of the Peabody Museum of Archæology so eminently fitted him. So thoroughly did Prof. Wyman cover the subject, and so conclusive were his deductions that the writer of the present paper would hesitate to attempt any farther work upon the subject were it not that the possession of steam motive power, and the aid of many assistants have put it in his power to explore a large tract of territory hitherto unvisited by any one with a view to the exploration of shell heaps, and to excavate on a scale never before undertaken on the River.

Previous to the work of Professor Wyman, the shell heaps of the St. John's, while their presence was referred to in books of travel, remained uninvestigated by scientists, with the exception of Dr. Brinton. After a personal examination of these shell heaps their construction was attributed by Dr. Brinton to the action of the River (Floridian Peninsula, Page 180). Just how this conclusion was reached is difficult to understand. The writer, in several hundred excavations made in upwards of sixty localities, cannot recall a single one where the agency of man was not apparent. In every excavation of any size, unmistakable traces of ancient fires were discovered, evidenced at times by masses of burnt or calcined shells, and again by layers of shells reduced almost to powder by the

action of the flames. In addition to this, but less evenly distributed throughout the shell heaps, were fragments of pottery and implements of bone, stone and shell.

To Prof. Wyman then belongs the credit of the demonstration beyond question of human agency in the origin of the fresh-water¹ shell heaps of the St. John's.

The territory on the River covered by the writer, beginning near Whetstone Point, nine miles north of Palatka, and ending at Turtle Mound,² four miles north of Lake Washington, is about 300 miles in extent, *by water*. (Note A). So devious is the river above Lake Harney that no map attempts to outline its twists and looped-shaped bends, and only estimates as to distance can be made. South of Lake Harney the solid land virtually ceases, and the river from a few feet in breadth at times broadens into great lagoons, or never-ending marsh. At every point where a landing can be effected in high water, or where the palmetto can be seen, is a shell deposit made of the debris of the meals of the aborigines. It is with these swamp shell heaps that these papers will have principally to do, since they are of greater interest, not alone through absence of all exploration hitherto, but also because their contracted space more richly rewards investigation.

The shell heaps of the St. John's are refuse heaps simply, and in them refuse alone can be expected under ordinary circumstances; but as articles of value sometimes find their way into ash heaps and dumping places at the present day, so, at times, do weapons and implements, unbroken and in good condition, come to light in the shell heaps. These heaps frequently attain enormous size. Bluffton, the property of Mr. William E. Bird, has thirty acres³ in shell, and in one part

¹It will be remembered that large deposits of marine shells, principally of the oyster, exist at Mayport, near the mouth of the St. John's. These shell deposits will not be discussed in these papers, and all allusions to shell heaps will have reference to fresh-water shell heaps alone.

²Another mound of this name is situated near New Smyrna on the east coast.

³Mr. Chas. H. Curtis, Superintendent of the Bluffton grove, informed the writer that of the fenced portion of the property (forty-five acres) two-thirds consist of shell deposit. The writer, after a careful examination, considers the shell deposit somewhat more.

reaches a vertical height of twenty-five feet from the level of the river.

By far the larger portion of the shell heaps is made up from the remains of fresh-water shell fish, while the bones of various edible animals, principally deer, alligator and turtle, and sometimes of man, crushed, split and occasionally charred, are found in them, but in very unequal distribution.

The stand-by of the aborigines was the *Paludina georgiana*, a fresh-water snail. (Note B). Among the shells of this class, sometimes composing a layer of itself, is found the *Ampullaria depressa*, a snail of great size. The *Unio* (mussel) at times forms a fair percentage in the heaps. The *Glandina truncata*, a land shell, is occasionally met with, while various marine shells from the coast are of not infrequent occurrence.

Prof. Wyman has called attention to a certain difference in size in favor of the *paludinæ* and *ampullariæ* of the shell heaps over those found in the river and its tributary streams at the present day. To this matter the writer has devoted careful attention, and has succeeded in finding *paludinæ* and *ampullariæ* in the shell heaps far larger than any modern shells of the same variety and greatly exceeding in size, so far as the *ampullariæ* are concerned, the measurements given by Prof. Wyman of those from shell heaps. (Note C). As to *paludinæ* no statistics are furnished by him.

Stratification in the shell heaps is of course a matter of accident. The aborigines doubtless made use of the species of shell fish for the time being the most abundant, and such layers are of necessity local and not traceable through the entire heap. The condition of the shells often varies greatly in different portions of the same mound. At times large quantities are found unbroken, without admixture of sand or loam, and so loosely thrown together that they can be literally scooped from the hole; again other portions of mounds are met with where fragments of shell and sandy loam are found in such close connection that the aid of a pick is necessary to effect their removal. It is apparent therefore that some parts of the shell heaps grew up under the aborigines dwelling upon them, and were beaten down and made solid by the press-

ure of many feet for long periods of time, during which periods refuse organic matter was in quantities mingled with the shells; while other parts owe their existence to the dumping of masses of shell by natives not dwelling immediately upon them.

The shell heaps may be divided into four classes in respect to construction:

1. Heaps where shells broken and crushed with a large admixture of sand and loam are closely packed, showing that the mound, by slow accretion of refuse, grew up beneath the feet of the inhabitants.

2. Heaps where unbroken shells with little intermingling of sand lie loosely together, and in which loam is wanting, indicating that the inhabitants living near by carried their refuse to a common dumping place.

3. Stratified heaps, composed of alternate layers of unbroken shells and of crushed shells with sandy loam, testifying that the mound has at different times served as place of residence and refuse heap.

4. Heaps where materials of the first and second classes closely adjoin, leading to the belief that the original heap, used for domiciliary purposes, has been supplemented by a contiguous pile of debris.

To these might be added a fifth class, comprising perfectly symmetrical mounds of shell in the form of truncated cones, possibly constructed from materials of a shell heap for use as ceremonial mounds or as watch towers. Mounds of this class are found at Bluffton and at Huntoon Island, and still await a careful investigation.

No effort will be made to demonstrate the existence of cannibalism among the makers of the shell heaps, as the mass of evidence collected by the writer so entirely corroborates the theory of Prof. Wyman that further discussion on the subject would seem unnecessary. The writer, however, is strongly of the opinion that cannibalism was not practiced by the earliest makers of the shell heaps, for while bones of the lower animals are found at every depth throughout the shell heaps, human bones, treated in a manner similar to those of the edible lower

animals, were not upon a single occasion, among several hundred excavations, met with below two feet from the surface. It will be remembered that upon one occasion only were human remains found by Prof. Wyman at a considerable depth; namely those at Osceola Mound (now Crow's Bluff, Lake County), and that they were not particularly broken. The articular portions of several had been severed by a cutting instrument, a suspicious circumstance. The writer, however, until farther facts are adduced, will remain of the opinion that cannibalism, as a custom, was practiced only towards the close of the period of the shell heaps.

Another conclusion arrived at by Prof. Wyman seems based upon the strongest probability. When after a long and careful search in a shell heap no pottery is brought to light, it may be considered that the makers of the heap lived at a time when the method of its manufacture was unknown. Pottery filled so great a want in the lives of the aborigines and was so extensively used by the makers of the shell heaps where it is found at all, that it seems impossible to account for its absence upon any hypothesis other than the one suggested. One fact relating to pottery which Prof. Wyman neglects to state is that in many shell heaps pottery is found to a certain depth only, after which it entirely disappears. In other shell heaps pottery, plain and ornamented, is found in association for a time, after which unornamented pottery alone is found. These points in connection with the pottery of the shell heaps have been noticed in so many scores of cases that the writer is convinced that many shell heaps were in process of formation contemporaneously with the first knowledge of the art of pottery making and its subsequent development. It will be remembered that Prof. Wyman was hampered in his researches by inadequate assistance in respect to the manual labor of digging, and it is likely that certain facts buried deeply beneath the surface escaped him. It is to be regretted that in nearly every case he neglects to state the *depth* at which weapons and other implements were found, and whether pottery ornamented or plain, or both, was met with in association. It is well known that later Indians occupied the shell heaps as places of

residence long after their completion ; some doubtless cultivating them, and hence distance from the surface is a most important factor in determining the origin of shell heap relics of all sorts.

Before proceeding to a detailed account of certain shell heaps hitherto unexplored, the writer feels it in justice to himself to state that in all excavations conducted by him not one spadeful of debris has been thrown out except in his presence ; that in no case has he relied on hearsay testimony, and that dimensions are derived from measurements, and not from estimate.⁴

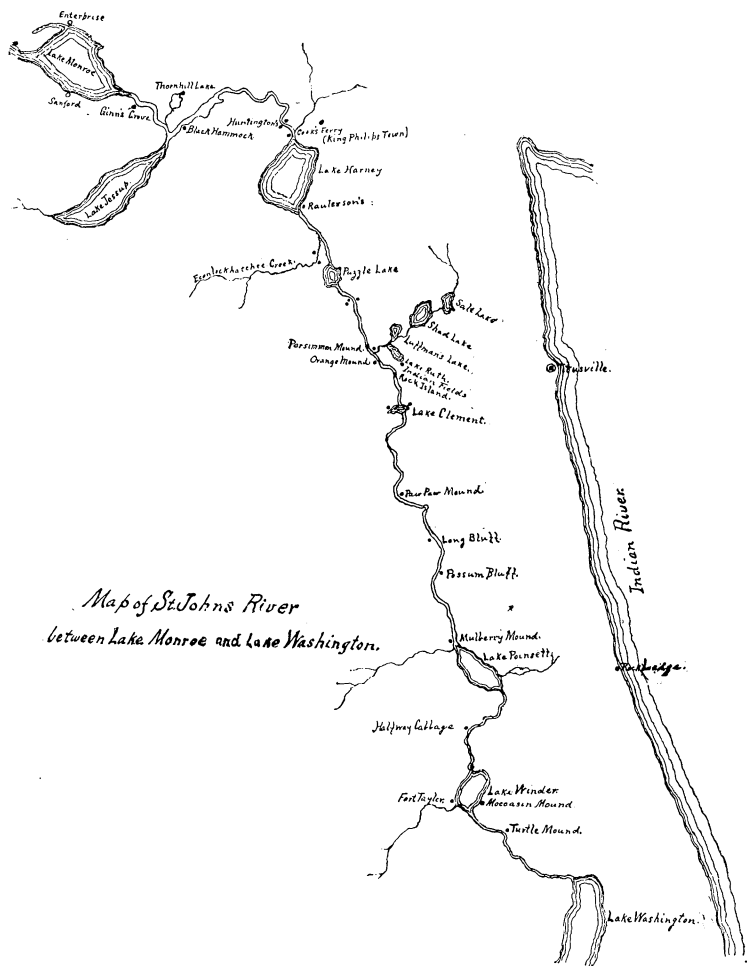
LIST OF SHELL HEAPS HITHERTO UNEXPLORED ON, OR NEAR
THE ST. JOHN'S RIVER, FLORIDA.

1. Near Whetstone Point, nine miles north of Palatka, west bank.
2. Shell heap three miles north of Palatka, west bank.
3. Barrentine's, on Trout Creek.
4. Shell Ridge, in swamp half a mile north of Horse Landing, east bank.
5. Shell heap one mile north of Welaka, east bank.
6. Two shell heaps about half a mile apart, right hand side going up Salt Run, Lake George.
7. Shell heap and fields Hitchen's Creek, south of Volusia Bar.
8. Large shell heap in swamp near Morrison's Creek, south of Volusia Bar.
9. Two shell fields near Morrison's Creek.
10. Shell bluff near mouth of Blue Creek, south of Volusia Bar.
11. Shell heap, Duval's, Blue Creek.
12. Mt. Taylor, in swamp east bank of St. John's, one mile south of Volusia.
13. Bird's Island in river, south of Volusia.
14. Small shell heap west bank, opposite Bluffton.
15. Shell heaps, ridges and fields, Tick Island on Spring Garden Creek, near Lake Dexter.

⁴The writer's collection of objects found in the shell heaps may be seen at the Wagner Free Institute, Philadelphia.

16. Shell heap, Spring Garden Creek, east of Lake Woodruff.
17. Mosquito Grove, west bank, four miles north of St. Francis.
18. Shell field on second lagoon south of Hawkinsville.
19. Shell heaps and ridges Thornhill Lake, near Lake Jesup.
20. Huntington's west bank, one mile north of Lake Harney.
21. Small shell deposit opposite Huntingdon's east bank.
22. Shell heap in hammock about two miles east of Cook's Ferry.
23. Shell heap and fields, Raulerson's, southeast end of Lake Harney.
24. Small shell heap in prairie, west bank, about one mile south of Lake Harney.
25. Shell heap in prairie near Econlockhatchee Creek, right hand side going up, about one mile from the St. John's River.
26. Shell heap west side of Puzzle Lake, south of Econlockhatchee Creek.
27. Shell heap about six miles south of Puzzle Lake, west bank of St. John's River.
28. Shell heap about one-quarter of a mile south of preceding.
29. Shell heap in marsh east bank in sight of preceding.
30. Orange mound, about twenty-one miles by water south of Lake Harney.
31. Persimmon mound, east bank near Lake Ruth.
32. Indian fields, Lake Ruth.
33. Rock Island, one mile east of Orange mound.
34. Shell heap on Lake Clement, or Cane Lake.
35. Shell heap opposite above.
36. Paw Paw Island.
37. Long Bluff, two shell Fields.
38. Opossum Bluff, east bank.
39. Mulberry mound, near Lake Poinsett.
40. Half-way mound, between Lakes Winder and Poinsett.
41. Fort Taylor, southwestern end of Lake Winder.

PLATE XXIV.



42. Moccasin Island, southeast end of Lake Winder.
43. Turtle mound, four miles north of Lake Washington.

NOTE A.

EXTENT OF FRESH-WATER SHELL HEAPS ON THE ST. JOHN'S.

As stated, the extreme southerly point reached by the writer was Turtle mound, four miles north of Lake Washington. At this point the river is so obstructed by islands, formed from masses of floating plants, that further progress by the channel in any form of boat is impossible between that point and Lake Washington. Row boats, however, by making use of cut-offs, known to natives, can reach the Lake and go beyond without much difficulty. The river extends, after leaving Lake Washington, to a point considerably south of the Sawgrass Lake, and very many trappers questioned by the writer were agreed that shell heaps are met with to the very source of the river and that on them alone can camping places be found among the surrounding marshes. So universal was the testimony to this effect that the writer considers it safe to accept it.

The most northerly fresh-water shell heap is presumably near Whetstone Point, nine miles north of Palatka. Prof. Wyman, though thoroughly acquainted with the river below, failed to find any shell deposits farther north, and the writer during sixteen seasons spent in Florida, of which much time was passed upon the river, has been unable to discover or to hear of any fresh-water shell deposits lower than Whetstone Point. A large number of persons familiar with the river in every capacity have been questioned; some perfectly acquainted with the shell heaps farther south, but no clue as to the existence of more northerly shell heaps has been gained.

Until proof to the contrary be adduced the northern limit of the shell heaps must be considered as stated above. And this gives rise to an interesting question—why on the ninety-one miles of river below Whetstone Point are no shell deposits found? Some of the most advantageous places of abode on the river are met with north of Palatka, while tributary streams are abundant. The writer has found *ampullariæ* at

Magnolia, fifty-three miles from the river's mouth, while shell collectors state that fresh-water snails are sparingly found in tributary creeks near Jacksonville, twenty-five miles from the sea. Beyond this point no data have been obtained. After careful consideration of these facts the writer thinks it probable that the discontinuance of the line of shell heaps was a necessity imposed upon the aborigines through an insufficient supply of their staple article of diet, and that this scarcity arose through a certain admixture of salt water coming with the tide from the sea.

The tide in the St. John's is noticeable as far south as Lake George, and it is stated on competent authority that barnacles are found on pilings at Palatka, hence it is very probable that an admixture of salt water in which only the most hardy fresh-water mollusca can live is met with in the neighborhood of that town. It is also not improbable that conditions now existing at the mouth of the river were not found in earlier times, and that the absence of a bar admitted a greater flow of tide water, in which event fresh-water shell fish within reach of the brackish water would be even less numerous than at present.

NOTE B.

AS TO THE METHOD OF COOKING APPLIED TO SHELL FISH.

The method of preparation of the shell fish as a medium of diet by the aborigines must be considered an open question. Upon no shells at any distance from the various fire places are marks of fire traceable, from which it would appear that roasting was not the method employed.

While boiling would leave no trace on the shells, a question naturally arises as to the method of accomplishment of this form of cooking by those living on certain heaps to whom the manufacture of pottery was unknown. If baskets of wicker or bowls of wood, in which the water was heated by stones previously exposed to the action of fire, were used, such stones would of necessity be comparatively abundant in the shell heaps. But they are wanting.

The theory that the shell fish were eaten without recourse to cooking would seem untenable, since too many shells are found in perfect condition. It is true that a certain proportion of the *ampullariæ* and *paludinæ* (about ten per cent. in some of the heaps) is perforated, and that these perforations were artificially made, since there are no predatory fresh-water mollusks; still it is difficult to see of what assistance such a perforation would be in the extraction of the shell fish without the aid of boiling water. It is therefore apparent that the subject of the culinary methods of the savages⁵ who built the earlier shell heaps of the St. John's—a question never before touched upon—opens a field for careful research.

NOTE C.

SIZE OF THE SHELLS OF THE MOUNDS AS COMPARED TO RECENT SHELLS OF THE SAME SPECIES.

While the shells of *ampullariæ* and *paludinæ* from certain shell heaps greatly exceed in size those of recent specimens, as the subjoined table, kindly compiled by Mr. H. A. Pilsbry of the Academy of Natural Sciences of Philadelphia, will prove, the shells met with in certain other mounds of the St. John's show little, if any, excess in size over living specimens to be found in the neighborhood. In a number of the older mounds (if absence of pottery be taken as an indication of greater antiquity, and there seems to be no reason why it should not) shells are much smaller than in certain mounds at times but a few miles distant, where pottery is found in abundance. It would seem therefore, that there must have been a middle period when these fresh-water shell fish attained their highest degree of development, and that that period was reached after the completion of certain shell heaps and during the construction of others. Neither Buffalo Bluff, Orange Mound nor the portion of the shell heap on Hitchen's Creek, where very large shells were found by the writer, can be considered as belonging to the older shell heaps of the St. John's.

⁵Lewis Morgan (Ancient Society, New York, 1877) draws the line between savagery and barbarism at the point where pottery comes into use. The distinction is approved by Fiske "The Discovery of America" vol. 1, page 24, et seq.

TABLE OF MEASUREMENTS OF AMPULLARIA DEPRESSA.

Dimensions in Millimetres, 25 equal 1 inch.

LOCALITY.	Height.	Diameter.	Remarks.
Orange Mound.....	80	80	Largest specimen on record.
Buffalo Bluff.....	75	77	
Recent Specimen.....	55	53	Largest in collection Phila. Acad. Nat. Sciences.

TABLE OF DIMENSIONS OF PALUDINA GEORGIANA.

LOCALITY.	Height.	Diameter.	Height of Aperture.	Remarks.
Mound on..... Hitchen's Creek...	50	33	25	Largest specimen seen.
	40	27		Average from 25 meas.
	45	24	18	Elongated specimens. (Variety <i>Altior</i>).
	42	25	15	
Recent Specimens....	30	23	17	Largest of 200 seen.
Hitchen's Creek.....	27	20	15	Average size.
Recent Specimens....	33	25		Largest recent specimen in collection of Phila. Acad. Nat. Sciences.

It will be noted that the aperture of the shell, in specimens from the mound, measures from one-half to about one-third the length of the shell; but in recent specimens, from the adjacent creek, it is in every case over one-half the shell's length. No living specimens on record attain the size of the average shells of some of the mounds, as will be seen by the figures in the first column.